Universal Terminology

Chapter 7: Hierarchical lists

This chapter considers the different hierarchical lists available for the presentation of the $\mathbf{T}_{logy}$.
The concept of signature of a list is developed, insuring the integrity of the lists in presence of a potential continuous flow of updates along the time.
This document is the chapter 7 of the book Universal Terminology which presents a global documentation on the $\mathbf{T}_{logy}$.

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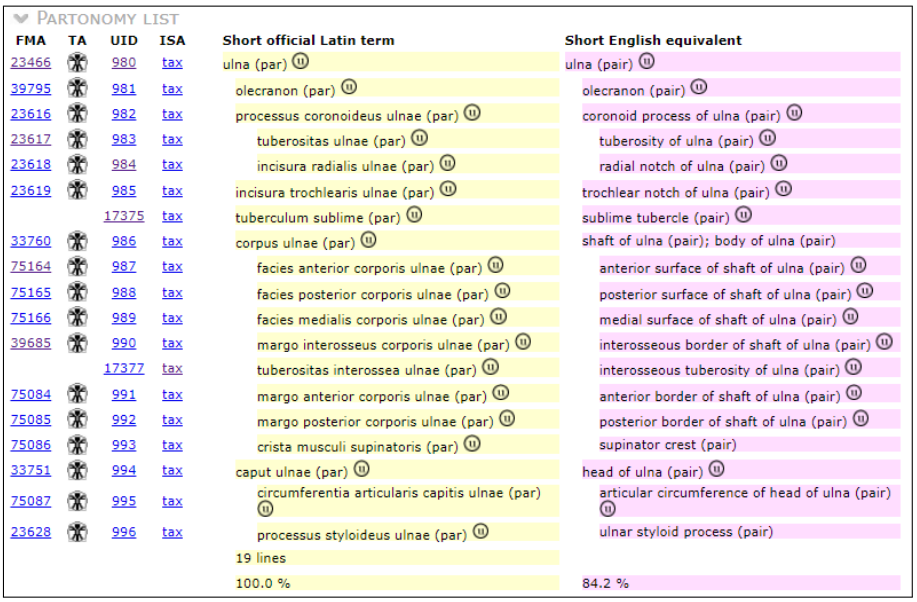
7.1 Integrity of lists

As a general statement, a list is an organized sequence of entities with the intention of documenting an aspect of the $\mathbf{T}_{logy}$according to an existing hierarchy. But such a documentation process is endless: at any time it would be possible to add new information and to describe this aspect with more details. In reality, the authors of the $\mathbf{T}_{logy}$are facing the difficult problem of deciding how much information is necessary and sufficient. When this decision has been set up, the corresponding lists can be considered as frozen as long as a new decision is not foreseen.

When a list is terminated and frozen, it has an integrity under the form of different criteria: the choice of the entities constituting the list, their order, their indentation, and their numbers. The list is the result of a decision process by the authors of the terminology, expressing their willingness to show certain entities and to ignore others. This is not an arbitrary decision, but the search of a precise documentation of the domain: a sufficient information limited to what is necessary. Of course, such a decision is debatable between the specialized experts and the general users of the terminology.

An example is given in figure 7.1. The concept of integrity of this list means that LA: *ulna* is conveniently described by 6 entities being direct children and a total of 18 entities. This list can be compared to a figure in an atlas of anatomy showing this bone with 18 labels. From this example, we can see that two entities are new in TAH and absent of TA98. This means that the list has been augmented in the new terminology.



PARTONOMY LIST

FMA	TA	UID	ISA	Short official Latin term	Short English equivalent
23466		980	tax	ulna (par)	ulna (pair)
39795		981	tax	olecranon (par)	olecranon (pair)
23616		982	tax	processus coronoideus ulnae (par)	coronoid process of ulna (pair)
23617		983	tax	tuberositas ulnae (par)	tuberosity of ulna (pair)
23618		984	tax	incisura radialis ulnae (par)	radial notch of ulna (pair)
23619		985	tax	incisura trochlearis ulnae (par)	trochlear notch of ulna (pair)
		17375	tax	tuberculum sublime (par)	sublime tubercle (pair)
33760		986	tax	corpus ulnae (par)	shaft of ulna (pair); body of ulna (pair)
75164		987	tax	facies anterior corporis ulnae (par)	anterior surface of shaft of ulna (pair)
75165		988	tax	facies posterior corporis ulnae (par)	posterior surface of shaft of ulna (pair)
75166		989	tax	facies medialis corporis ulnae (par)	medial surface of shaft of ulna (pair)
39685		990	tax	margo interosseus corporis ulnae (par)	interosseous border of shaft of ulna (pair)
		17377	tax	tuberositas interossea ulnae (par)	interosseous tuberosity of ulna (pair)
75084		991	tax	margo anterior corporis ulnae (par)	anterior border of shaft of ulna (pair)
75085		992	tax	margo posterior corporis ulnae (par)	posterior border of shaft of ulna (pair)
75086		993	tax	crista musculi supinatoris (par)	supinator crest (pair)
33751		994	tax	caput ulnae (par)	head of ulna (pair)
75087		995	tax	circumferentia articularis capitis ulnae (par)	articular circumference of head of ulna (pair)
23628		996	tax	processus styloideus ulnae (par)	ulnar styloid process (pair)
				19 lines	
				100.0 %	84.2 %

Figure 7.1: A taxonomic list at level P3. This list can be observed there. In this list, two entities was not present in TA98 and have been added for TAH, as an explicite decision by the authors of the $\mathbf{T}_{logy}$. One of them is the LA:*tuberculum sublime* which is a site of avulsion fractures with a significant rate of occurence due to sport practice.

7.2 Type of hierarchical lists

In this section, we make the inventory of all types of hierarchical lists present in the $\mathbf{T}_{logy}$. Then, in the subsequent sections, we will document each specific type of list in turn. Finally we will define what is the signature of a list.

7.2.1 Partonomic lists

The partonomic lists are based on the part_of relation that is documented in *chapter 13*.

Partonomic list
`A partonomic list is (definition) a sequence of entities organized according to the partonomic hierarchy, identified by a top entity and with an extension down the hierarchy up to the leaves or up to a sublist being itself a partonomic list.`

7.2.2 Generic lists

The generic lists are partonomic lists which top entity is a generic entity.The generic lists are documented in chapter *chapter 02*.

7.2.3 Taxonomic lists

The taxonomic lists are based on the isa relation that is documented in chap12.

Taxonomic list
`A taxonomic list is (definition) a sequence of entities organized according to the taxonomic hierarchy, identified by a top entity and with an extension down the hierarchy up to the leaves or up to a sublist being itself a taxonomic list.`

7.2.4 Lists of sublists

The sublists are partial lists, either from the partonomy or from the taxonomy, based on the levels defined elsewhere in the documentation of the $\mathbf{T}_{logy}$. The sublists can be presented as a hierarchy.

7.2.5 Published lists

Published list
`A published list is (definition) a partonomic list which has been frozen at a specified point in time.`

The published lists are acting as reference versions of the $\mathbf{T}_{logy}$at important point in time of the development of the terminology. The same list may have several published lists which document the history of its development. A published list is normally created on a stable version and may be preferred by some users of the $\mathbf{T}_{logy}$looking for a reference in anatomy and not directly interested by the more recent developments.

There are no published lists of the taxonomy, because such a release belongs to the authors of the FMA only.

7.2.6 TA98 lists

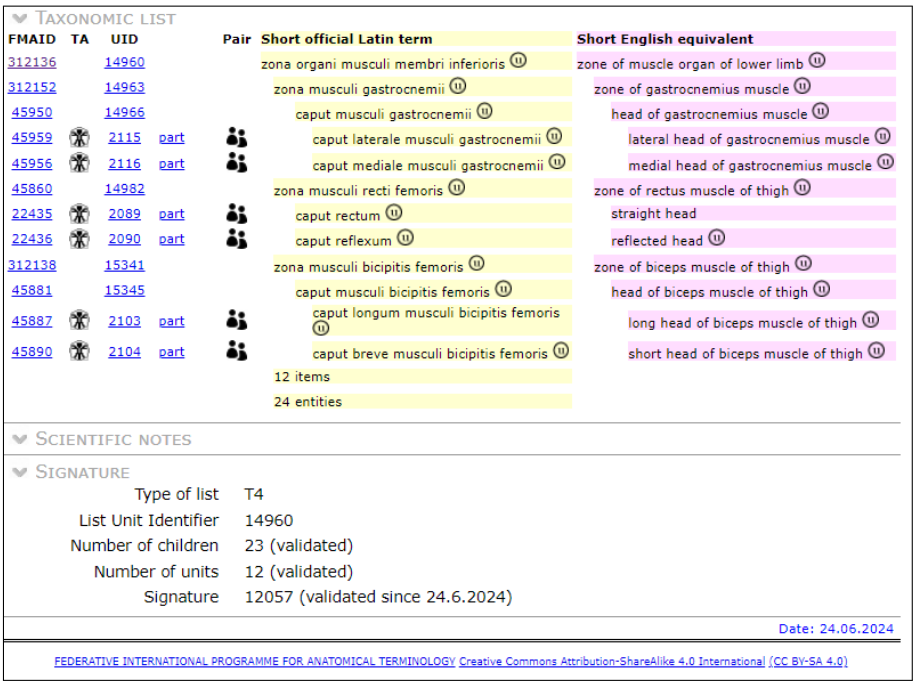
The TA98 lists is a list extracted from the TA98 terminology, as published in 1998.

7.2.7 Vocabulary lists

The vocabulary lists are realized on a pseudo hierarchy of the words, in order to organize their storage into groups of reasonable size favoring the presentation. Such a hierarchy is pragmatic, but not significant.

7.3 Signature of a list

In order to document the authenticity of a list regarding its content, which can vary either by regular updates or by unforeseen accidents when manipulating the database, a signature of a list has been designed. The signature is mainly dependent on the content of the list that it authenticates and definitely independent of the language where the list is translated: any change to the content of a list results in a new signature.



TAXONOMIC LIST

FMAID	TA	UID		Pair	Short official Latin term	Short English equivalent
312136		14960			zona organi musculi membri inferioris	zone of muscle organ of lower limb
312152		14963			zona musculi gastrocnemii	zone of gastrocnemius muscle
45950		14966			caput musculi gastrocnemii	head of gastrocnemius muscle
45959		2115	part		caput laterale musculi gastrocnemii	lateral head of gastrocnemius muscle
45956		2116	part		caput mediale musculi gastrocnemii	medial head of gastrocnemius muscle
45860		14982			zona musculi recti femoris	zone of rectus muscle of thigh
22435		2089	part		caput rectum	straight head
22436		2090	part		caput reflexum	reflected head
312138		15341			zona musculi bicipitis femoris	zone of biceps muscle of thigh
45881		15345			caput musculi bicipitis femoris	head of biceps muscle of thigh
45887		2103	part		caput longum musculi bicipitis femoris	long head of biceps muscle of thigh
45890		2104	part		caput breve musculi bicipitis femoris	short head of biceps muscle of thigh
					12 items	
					24 entities	

SCIENTIFIC NOTES

SIGNATURE

Type of list	T4
List Unit Identifier	14960
Number of children	23 (validated)
Number of units	12 (validated)
Signature	12057 (validated since 24.6.2024)

Date: 24.06.2024

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Figure 7.2: A taxonomic list at level T4 with a validated signature. This list can be observed there.

Signature of a list
`A signature of a list (definition) is an integer value between 1 and 25000 that is computed from three features of the list: the unit identifiers of each entity in the list, the order of the entities and the indentation of the entities.`

The three features in this definition are totally independent of the terms representing the entities of the list. Consequently, the signature is independent of the used language: the same signature is valid for all languages. Any divergence between two lists means that the lists have a different content on at least one entity of the list based on one of the three criteria. A list without signature section is a list which has not yet been validated.

An example of a T4 taxonomic list with a fully validated signature can be seen on figure 7.2. The last three lines of the signature section show the three features of a validated list.

7.4 Validation of a list

The validation of a given list consists in the regeneration of this list, the computing of its actual signature and the match of this signature with the previous valid signature as stored in the database. In addition the database stores the validated values of the number of units and the number of entities, which should also match.

The basic idea is the following: once a list is stable and ready to validate,

the signature and the number of units and entities are computed and then store in the database. This process ensure the freezing of the list that is totally dependent on these three values: any change of any value gives the alarm signal that the list has been changed. If this is the result of a concerted action, the new values are stored in the database and the new list becomes the valid reference. If the change is due to an accident or any unforeseen action, there is a need to check the content of the list with special care until some justification of the move is detected and acknowledged.

In reality, the lists are not stand-alone, but often a large list is made of smaller lists with the system of four levels in a hierarchy of sub-lists. This means that when a list at a low level is changed, all the lists at the upper levels are also changed, at minimum their signatures are changed. There is a cascade of changes to be taken into account for any single change. For this reason and because the maintenance of the validation values is time consuming, one can sometimes find numerous lists with invalid values: this is temporary situation, waiting for the resources for a new set of validations. But when a list has not been validated, it does not means that it is necessarily wrong!

Another information comes with the validation system of signatures. The last validation is dated. The delay between now and this date is an indication of the stability of a list: the longer the delay - possibly a couple of years - the better the stability.

7.5 Log of updates

23 Jun 2024 Introduction of the signatures of lists.

05 Apr 2022 Creation of the file.

7.6 Credentials

This document is part of the book "Universal Terminology" accompanying the website on Terminologia Anatomica. It expresses the vision of the authors of the $\mathbf{T}_{logy}$about the foundations of the science of ontology, supporting the here presented terminology. Despite it is as exact as possible, close to the reality of the database of the terminology and the surrounding software, approximations, errors and ambiguities are possible and should be considered as independent of their willingness and intents.

Identified comments about the content of the website and its presentation are welcome. An appropriate answer will be given when pertinent.

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